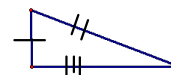


4-1 Classifying Triangles

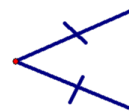
- By Sides
- By Angles

△ By Sides

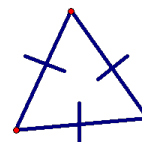
- Scalene
- No congruent sides



- Isosceles
- 2 congruent sides

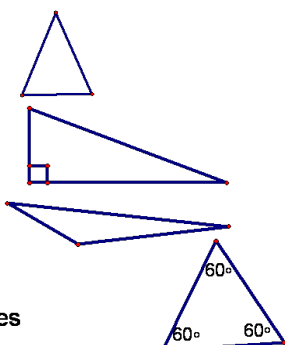


- Equilateral
- 3 congruent sides



By Angles

- Acute
 - 3 acute angles
- Right
 - 1 right angle
- Obtuse
 - 1 obtuse angle
- Equiangular
 - 3 congruent angles



Example

Classify the triangle by sides.

△ABC A(-5, -2) B(1, 4) C(1, -2)

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$AB = \sqrt{(-5-1)^2 + (-2-4)^2} = \sqrt{72}$$

36 + 36

$$BC = \sqrt{(1-1)^2 + (4-2)^2} = \sqrt{36}$$

$$AC = \sqrt{(-5-1)^2 + (-2-2)^2} = \sqrt{36}$$

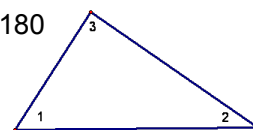
Isosceles

4-2 Angles of a Triangle

Theorem 4.1—Angle Sum

Theorem—the sum of the measures of the angles of a triangle is 180 degrees

$$m\angle 1 + m\angle 2 + m\angle 3 = 180$$



Example

Classify the triangle by sides.

 $\triangle AMY$ A(-3, 4) M(3, 1) Y(0, -2)

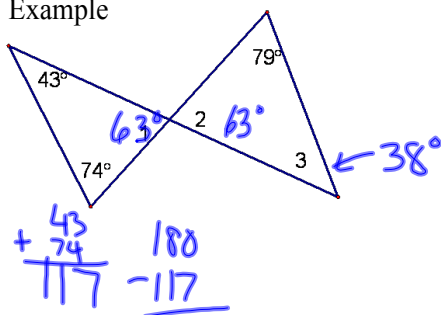
$$AM = \sqrt{75}$$

$$MY = \sqrt{18}$$

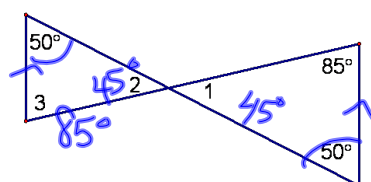
$$AY = \sqrt{45}$$

Isosceles

Example

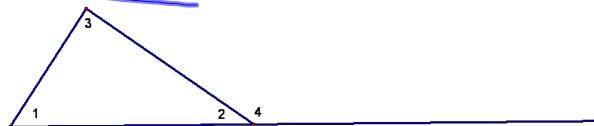


Example



Theorem 4.2—3rd Angle Theorem—If 2 angles of 1 triangle are \cong to 2 angles of another triangle, then the 3rd angles are \cong .

What is $\angle 3$ to 180?

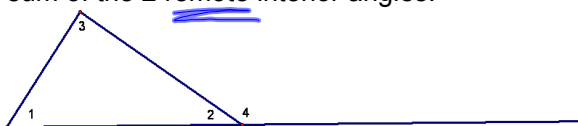


$$m\angle 1 + m\angle 2 + m\angle 3 = 180 = m\angle 2 + m\angle 4$$

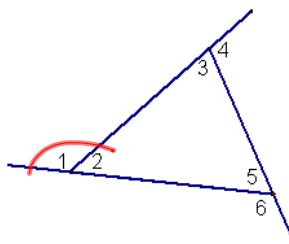
$$m\angle 1 + m\angle 2 + m\angle 3 = m\angle 2 + m\angle 4$$

$$m\angle 1 + m\angle 3 = m\angle 4$$

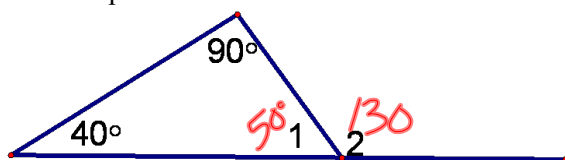
Theorem 4.3—Exterior Angle Theorem—The measure of an exterior angle of a triangle = the sum of the 2 remote interior angles.



$$m\angle 1 + m\angle 3 = m\angle 4$$



Example

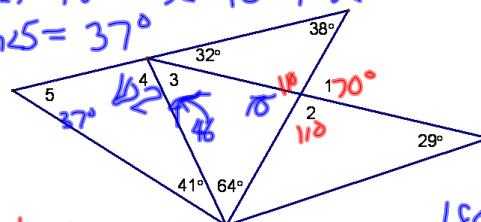


$$m\angle 2 = 90 + 40$$

Find the measures of the numbered angles.

$$m\angle 4 = 180 - 32 - 46 = 102$$

$$m\angle 5 = 37^\circ$$



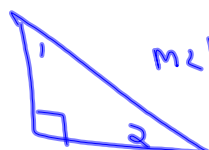
$$m\angle 1 = 32 + 38 = 70$$

$$m\angle 2 = 180 - 70 = 110$$

$$\begin{array}{r} 180 \\ 64 + 70 = 134 \\ \hline m\angle 3 = 46 \end{array}$$

Corollary- Statement that can be easily proven

Corollary 4.1—The acute angles of a right triangle are complementary



$$m\angle 1 + m\angle 2 = 90$$

Corollary 4.2—There can be at most one right or one obtuse angle in a triangle

Homework

- p. 180-182 #s 7, 9-11, 33
- p. 189-190 #s 11, 12, 15-23, 33-38